

WHAT IS CLAIMED IS:

1. A multi-stage variable orifice flow obstruction sensor for measuring a fluid flow in an enclosed housing, the sensor comprising:

a body member receivable within the enclosed housing, the body member defining an aperture therethrough;

a cover member engaged to the body member and disposed within the aperture, the cover member being movable between open and closed positions with respect to the aperture;

a flow-limiting obstruction member engaged to the body member and disposed within the aperture adjacent the cover member, the flow-limiting member being sized and configured to apply a generally opposing force to the cover member when the cover member extends to the open position and contacts the flow-limiting member; and

wherein a pressure differential of the fluid is sensed to measure the fluid flow therefrom.

2. The sensor of Claim 1 wherein the body member is concentrically receivable within the enclosed housing.

3. The sensor of Claim 2 wherein the body member is cylindrically configured.

4. The sensor of Claim 2 wherein the enclosed housing is a pipe.

5. The sensor of Claim 1 wherein the body member has an inner wall defining the aperture, the cover member

and the flow-limiting member being engaged to the inner wall in a spaced apart relation to each other.

6. The sensor of Claim 1 wherein the cover member is biased in the closed position and has a front cover member surface, the cover member being extendable towards the flow-limiting member when the fluid impacts the front cover member surface and flow through the aperture.

7. The sensor of Claim 6 wherein the cover member has a back cover member surface, the back cover member surface contacting the flow-limiting member when the front cover member surface is impacted by the fluid flow reaching a threshold velocity.

8. The sensor of Claim 7 wherein the flow-limiting member has a lower flow-limiting member portion, the lower flow-limiting member portion being contactable by the back cover member surface when the fluid flow reaches the threshold velocity.

9. The sensor of Claim 7 wherein the flow-limiting member is urged toward the cover member when the back cover member surface contacts therewith so as to mitigate the extension of the cover member caused by the fluid flow.

10. The sensor of Claim 1 wherein the cover member and the flow-limiting member are each fabricated from a resilient material.

11. The sensor of Claim 1 wherein the body member, the cover member and the flow-limiting member are each

fabricated from a metallic material.

12. The sensor of Claim 1 wherein the cover member and the flow-limiting member each comprises a plurality of slits for providing flexibility thereat.

13. The sensor of Claim 1 further comprising an anterior member engaged to the body member in a manner as to position the cover member between the anterior member and the flow-limiting member, the anterior member having an upper anterior member portion partially blocking the aperture.

14. The sensor of Claim 13 wherein the upper anterior member portion and the cover member collectively form at least one fixed flow orifice, the at least one flow orifice being sized and configured to allow the fluid to flow therethrough when a velocity of the fluid is not sufficient to extend the cover member towards the flow-limiting member.

15. The sensor of Claim 13 wherein the anterior member comprises at least one protrusion extending to the aperture so as to ensure that the cover member extends only towards the flow-limiting member.

16. The sensor of Claim 1 further comprising a pressure differential transducer connected to the enclosed housing, the pressure differential transducer being operative to generate an electrical signal corresponding to the pressure differential.

17. The sensor of Claim 16 further comprising a microprocessor for correlating the electrical signal to the fluid flow.

18. A multi-stage variable orifice flow obstruction sensor for measuring a fluid flow in an enclosed housing, the sensor comprising:

a body member concentrically receivable within the enclosed housing, the body member defining an aperture therethrough;

a cover member engaged to the body member and disposed within the aperture, the cover member being movable between open and closed positions with respect to the aperture;

an anterior member engaged to the body member adjacent the cover member, the anterior member having an upper anterior member portion sized and configured to partially block the aperture, the upper anterior member portion and the cover member collectively forming at least one fixed flow orifice for allowing the fluid to flow therethrough when the fluid flow fails to extend the cover member towards the open position; and

wherein a pressure differential of the fluid is sensed to measure the fluid flow therefrom.

19. The sensor of Claim 18 wherein the enclosed housing is a pipe.

20. The sensor of Claim 18 wherein the anterior

member comprises at least one protrusion extending to the aperture so as to ensure that the movement of the cover member corresponds only with the fluid flow.

21. The sensor of Claim 18 further comprising a flow-limiting obstruction member engaged to the body member in a manner as to position the cover member between the flow-limiting member and the anterior member, the flow-limiting member being disposed within the aperture, the flow-limiting member being sized and configured to mitigate the movement of the cover member when the cover member extends to the open position and contacts the flow-limiting member.

22. The sensor of Claim 21 wherein the cover member contacts the flow-limiting member when impacted by the fluid flow reaching a threshold velocity.

23. The sensor of Claim 21 wherein the cover member and the flow-limiting member are each fabricated from a resilient material.

24. The sensor of Claim 18 further comprising a pressure differential transducer connected to the enclosed housing, the pressure differential transducer being operative to generate an electrical signal corresponding to the pressure differential.

25. The sensor of Claim 24 further comprising a microprocessor for correlating the electrical signal to the fluid flow.